Eco. Env. & Cons. 30 (4) : 2024; pp. (1980-1985)
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ISSN 0971–765X

DOI No.: http://doi.org/10.53550/EEC.2024.v30i04.085

An Exploration of Macrophyte Diversity in Chakuli Beel and Bhereki Beel, Majuli District, Assam

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(Received 29 August, 2024; Accepted 31 October, 2024)

ABSTRACT

The current study was carried out at Chakuli Beel and Bhereki Beel in Majuli district over a one-year period, from March 2023 to April 2024, in order to assess the macrophytic diversity in Majuli district. During the present study, different plant species in a number of 58 which belongs to 43 genera and 27 families were recorded. Cyperaceae, Poaceae, Araceae, Polygonaceae, Amaranthaceae were the most Dominant families. The correct botanical name, local name, family of each plant has been documented in this study.

Key words : *Macrophyte, Wetland, Conservation, Diversity*

Introduction

Wetlands have the potential to be abundant in aquatic resources, which are crucial for preserving biodiversity. Marshes, swamps, bogs, and similar habitats are together referred to as wetlands, and they are home to a variety of important aquatic plants and animals, including Bird migration and threatened species (Cowardin, 1979). In Iran's Ramsar Convention on February 2, 1971, a universally recognized definition of wetlands was suggested, which is swamps are areas of marsh, fen, peat land, or water that are no deeper than six meters at low tide and can be either man-made or natural, temporary or permanent, and contain fresh, brackish, or salt water that is either flowing or stagnant, including marine water. In Assam, the term "beel" refers to the vast, lentic, perennial, freshwater bodies of water (Sharma, 1993).

Wetland plants that grow in or next to water are also known as macrophytes. Aquatic macrophytes are photosynthetic organisms that develop either permanently or temporarily in aquatic systems. They are huge enough to be seen with the naked eye (Chambers *et al*., 2008). Food, fodder, herbal medicine, and household supplies are all derived from aquatic macrophytes. Macrophytes are crucial to the structure and functioning of aquatic ecosystems (Wetzel, 2002). The aquatic ecosystem's primary productivity is significantly influenced by macrophytes as well. Water quality is influenced by aquatic macrophytes, which consume nutrients from the aquatic environment. By releasing different organic and mineral components, it also regulates the quality of the water. However, it also effectively accumulates heavy metals.

Biological stresses have significantly increased on these ecosystems in recent years, and it has been dis-

covered that numerous plant species and animals would disappear before modern times could comprehend them. Therefore, for a better knowledge of these delicate ecosystems and their appropriate management for human wellbeing, a methodical effort to study their flora and their accurate appraisal is required. Aquatic biodiversity recording and accurate assessment depend on the specific regions and their ecosystem. Because it will yield the data needed to create policies and programs for its efficient management and protection, it is more beneficial to maintain biodiversity in smaller regions.

Various Literature review revealed numerous workers carried out research related to diversity and distribution of wetland plants or Macrophytes in various parts of Assam (Choudhury and Brahma, 2016; Nath, 2012; Meena and Rout, 2016; Sarmah and Das, 2020).

There is a lack of Information regarding Macrophytes diversity of Chakuli Beel and Bhereki Beel of Majuli District. In this Study We record Macrophytes diversity of two study sites. This study may open the path in future to understand more on the composition of beels of this region and how it evolves over time.

Materials and Methods

An extensive survey was carried out on wetland angiospermic plant species of Chakuli and Bhereki Beel frequently in different season from March 2023 to April, 2024. During which regular survey was made at short interval on the Chakuli and Bhereki Beel. Collected specimens are identified by observing field data with authentic literature (Hooker, 1872-1897; Kanjilal *et al*., 1934-1940), virtual herbaria of BSI and eflora. For current accepted naming of plant POWO (2024) was used. Recorded plant species are enumerated in the Table 2. Bentham & Hooker's (1862-1883) classification system was followed to arrange the families and alphabetical order is used to arrange genera within the family and species within the genus.

Study area

Majuli is the world's largest freshwater mid-river

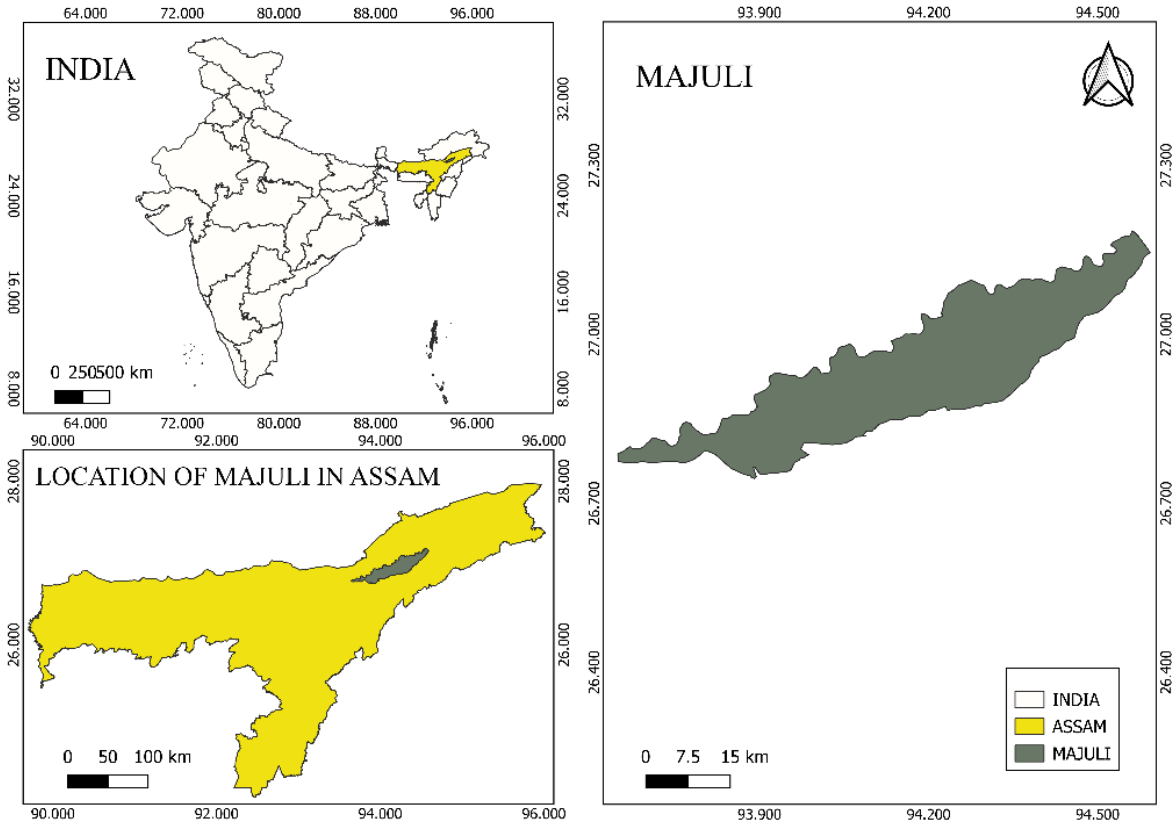

Fig. 1. Map of the study area, Majuli District, Assam

Fig. 2. Photographs showing Chakuli Beel and Bhereki Beel

deltaic island occupying an area of 880 km^2. Majuli has a total net planted area of 30,584 hectares and a total geographical area of 577 square kilometers (Bhagawati *et al*., 2018). Majuli island is located at 27°00' N Latitude and 94°132 E Longitude. It is approximately 84.5 meters above mean sea level (Singh *et al*., 2024). It is the meeting place of the Brahmaputra and Lohit rivers. The Brahmaputra and Subansiri rivers encircle the island on three of its sides, while the Kherkutia Suti, a Brahmaputra River tributary, encircles the island's fourth side (Bharasa *et al.,* 2020). Despite being in the tropical climate zone, Majuli has a sub-tropical climate because of its many wetlands, streams, etc. The summertime lowest temperature is 12 °C, while the maximum temperature ranges from 30 to 35 °C. Rainfall averages between 2000 and 2500 mm per year, with a relative humidity of 80% (Bhagawati *et al*., 2018).

In Majuli, there are around 155 wetlands. The two chosen wetlands where the survey was conducted are Bhereki Beel and Chakuli Beel. Both the beels are located in the village Laholial (Table 1).

Table 1. Showing selected wetlands with their area and geographical coordinates

Sl. No.	Wetland	Area (ha)	Geographical coordinates
1.	Bhereki beel	42.0	26.93070 N 94.13490 E
2.	Chakuli beel	1.5	26.94460 N 94.14760 E

Results

Documented species are enumerated in the Table 2.

Discussion

The current report is the result of a survey that was conducted in March 2023 to April 2024. From Bhereki beel and Chakuli beel in Majuli district, Assam, 58 aquatic and wet land angiospermic macrophyte species from 27 families have been identified (Table 2). According to a numerical study of the species distribution, 15 species are monocotyledons and 43 species are dicotyledons. The proper botanical name, local name, family name, dicot/monocot status of each plant have been listed (Table 2).

Based on the overall number of species, the current study determined that the Cyperaceae family is the most dominant (4 species) followed by Poaceae (3 species), Araceae (3 species), Polygonaceae(3 species), Amaranthaceae (3 species), Schrophulariaceae (3 species), Convolvulaceae (3 species), Asteraceae (3 species), Onagraceae (3 species), Nymphaeaceae (3 species), Alismataceae (2 species), Commelinaceae (2 species), Ranunculaceae (2 species), Euphorbiaceae (2 species), Lentibulaceae(2 species), Menyanthaceae (2 species), Apiaceae (2 species), Lythraceae (2 species), Oxalidaceae (2 species), Caryophyllaceae (2 species), Cleomaceae (1 species), Brassicaceae (1 species), Papaveraceae, Pontederiaceae (1 species), Rubiaceae (1 species), Trapaceae (1 species) and Heliotropaceae (1 species). Similar studies have also been carried out by Das (2013) where survey on macrophytes of Kamrup district revealed that Poaceae is the predominant family. Also, some surveys revealed Equisetaceae (Das and Sharma, 2024), Araceae, Convolvulaceae, Salviniaceae (Chowhan and Das, 2023) and Cyperaceae (Dutta *et al*., 2014) familes were the dominant ones.

Conclusion

Wetlands are referred to as "The kidneys of nature"

Table 2. Showing the diversity of macrophytes in both the beels- Bhereki and Chakuli

Sl. No.	Botanical Name	Local Name	Family	Dicot/Monocot
1.	*Ranunculus sceleratus* L.	Jaldhania	Ranunculaceae	Dicot
2.	*Ranunculus trichophyllus* Chaix	Kaurithengia	Ranunculaceae	Dicot
3.	*Euryale ferox* Salisb.	Makhana	Nymphaeaceae	Dicot
4.	*Nymphaea pubescens* Willd.	Bhetphul	Nymphaeaceae	Dicot
5.	*Nymphaea rubra* Roxb. ex Andrews	Ronga bhetphul	Nymphaeaceae	Dicot
6.	*Argemone mexicana* L.	Kuhum kata	Papaveraceae	Dicot
7.	*Rorippa indica* (L.) Hiern	Bon-sariah	Brassicaceae	Dicot
8.	*Cleome gynandra* L.	Khiyal kotohiy	Cleomaceae	Dicot
9.	*Drymaria diandra* Blume	Laijabori	Caryophyllaceae	Dicot
10.	*Stellaria media* (L.) Vill.	Moroliya	Caryophyllaceae	Dicot
11.	*Oxalis debilis* Kunth	Bor-tengesi	Oxalidaceae	Dicot
12.	*Oxalis corniculata* L.	Horu-tengesi	Oxalidaceae	Dicot
13.	*Cuphea carthagenensis* (Jacq.) J.F.Macbr.	Pani-jetuka	Lythraceae	Dicot
14.	*Rotala rotundifolia* (Buch.-Ham. ex Roxb.) Koehne	Beel- lehoti	Lythraceae	Dicot
15.	*Ludwigia adscendens* (L.) H. Hara	Heloch	Onagraceae	Dicot
16.	*Ludwigia octovalvis* (Jacq.) P.H. Raven	Long-bon	Onagraceae	Dicot
17.	*Ludwigia perennis* L.	Long-bon	Onagraceae	Dicot
18.	*Trapa natans* L.	Singori	Trapaceae	Dicot
19.	*Centella asiatica* (L.) Urb.	Bor-manimuni	Apiaceae	Dicot
20.	*Hydrocotyle sibthorpioides* Lam.	Horu-manimuni	Apiaceae	Dicot
21.	*Oldenlandia corymbosa* L.	Bon-jaluk	Rubiaceae	Dicot
22.	*Ageratum conyzoides* L.	Gendhali-bon	Asteraceae	Dicot
23.	*Eclipta prostrata* (L.) L.	Kehraj	Asteraceae	Dicot
24.	*Grangea maderaspatana* (L.) Poir.	Madras-carpet	Asteraceae	Dicot
25.	*Nymphoides hydrophyllum* (Lour.) Kuntze	Jetuka-khar	Menyanthaceae	Dicot
26.	*Nymphoides indica* (L.) Kuntze	Pani seuli	Menyanthaceae	Dicot
27.	*Heliotropium indicum* L.	Hati-xuriya	Heliotropaceae	Dicot
28.	*Evolvulus nummularius* (L.) L.	Olakha-bon	Convolvulaceae	Dicot
29.	*Ipomoea aquatica* Forssk.	Kolmou-sak	Convolvulaceae	Dicot
30.	*Ipomoea carnea* Jacq.	Bor-kolmou	Convolvulaceae	Dicot
31.	*Scoparia dulcis* L.	Seni-bon	Scrophulariaceae	Dicot
32.	*Torenia anagallis* (Burm.f.) Wannan, W.R. Barker & Y.S. Liang	Kasidoriya bon	Scrophulariaceae	Dicot
33.	*Torenia crustacea* (L.) Cham. & Schltdl.	Kasidoriya	Scrophulariaceae	Dicot
34.	*Utricularia aurea* Lour.	Patal-khar	Lentibulaceae	Dicot
35.	*Utricularia stellaris* L.f.	Khar bon	Lentibulaceae	Dicot
36.	*Alternanthera philoxeroides* (Mart.) Griseb.	Nol-duba	Amaranthaceae	Dicot
37.	*Alternanthera sessilis* (L.) DC	Mati kaduri	Amaranthaceae	Dicot
38.	*Amaranthus spinosus* L.	Kata khutura	Amaranthaceae	Dicot
39.	*Persicaria barbata* (L.) H. Hara	Bon-ghehu	Polygonaceae	Dicot
40.	*Persicaria glabra* (Willd.) M.Gómez	Bihlongoni	Polygonaceae	Dicot
41.	*Persicaria lapathifolia* (L.) Delarbre	Bon- ghegu	Polygonaceae	Dicot
42.	*Euphorbia hirta* L.	Gakhiroti bon	Euphorbiaceae	Dicot
43.	*Phyllanthus amarus* Schumach. & Thonn.	Bhui-amlokhi	Euphorbiaceae	Dicot
44.	*Pontederia crassipes* Mart.	Pani meteka	Pontederiaceae	Monocot
45.	*Commelina benghalensis* L.	Kona- simolu	Commelinaceae	Monocot
46.	*Murdannia nudiflora* (L.) Brenan	Kandoli	Commelinaceae	Monocot
47.	*Colocasia esculenta* (L.) Schott	Kochu	Araceae	Monocot
48.	*Pistia stratiotes* L.	Bor-puni	Araceae	Monocot
49.	*Typhonium trilobatum* (L.) Schott	Sama-kochu	Araceae	Monocot
50.	*Sagittaria guayanensis* Kunth	Jathipotia	Alismataceae	Monocot

Table 2. *Continued ...*

Sl. No.	Botanical Name	Local Name	Family	Dicot/Monocot
51.	*Sagittaria trifolia* L.	Pani-kochu	Alismataceae	Monocot
52.	*Cyperus compressus* L.	Mutha bon	Cyperaceae	Monocot
53.	*Cyperus iria* L.	NA	Cyperaceae	Monocot
54.	*Cyperus rotundus* L.	Keya bon	Cyperaceae	Monocot
55.	*Eleocharis dulcis* (Burm.f.) Trin. ex Hensch.	Kheluk	Cyperaceae	Monocot
56.	*Axonopus compressus* (Sw.) P. Beauv.	Dhepa bon	Poaceae	Monocot
57.	*Cynodon dactylon* (L.) Pers.	Dubori bon	Poaceae	Monocot
58.	*Hygroryza aristata* (Retz.) Nees ex Wight & Arn.	Petuli-dol	Poaceae	Monocot

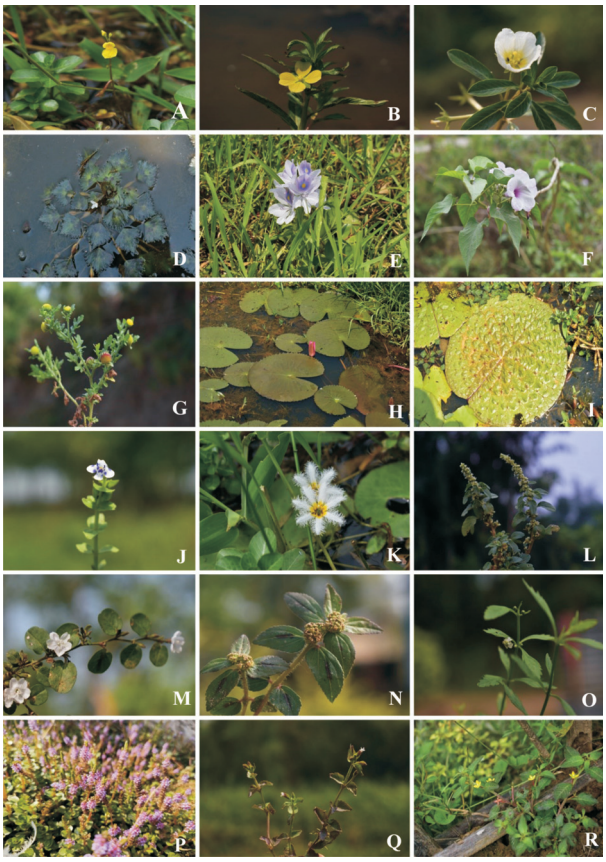

Plate. **A**. *Utricularia aurea* Lour., **B**. *Ludwigia octovalvis* (Jacq.) P.H. Raven, **C.** *Ludwigia adscendens* (L.) H.Hara, **D.** *Trapa natans* L., **E.** *Pontederia crassipes* Mart., **F.** *Ipomoea carnea* Jacq., **G**. *Grangea maderaspatana* (L.) Poir., **H**. *Nymphaea rubra* Roxb. ex Andrews, **I.** *Euryale ferox* Salisb., **J.** *Torenia crustacea* (L.) Cham. & Schltdl., **K**. *Nymphoides indica* (L.) Kuntze, **L.** *Amaranthus spinosus* L., **M.** *Evolvulus nummularius* (L.) L., **N.** *Euphorbia hirta* L., **O.** *Scoparia dulcis* L., **P.** *Rotala rotundifolia* (Buch.-Ham. ex Roxb.) Koehne, **Q.** *Torenia anagallis* (Burm.f.) Wannan, W.R.Barker & Y.S. Liang, **R.** *Ludwigia perennis* L.

and the macrophytic vegetations that grow there are crucial to preserving the system's resilience. Macrophytes are regarded as an essential part of the aquatic ecosystem since they provide as both the habitat and food supply for the aquatic life. Through the absorption of heavy metals from the water, a variety of macrophytes have the ability to eliminate water contamination and enhance water quality. The current study aims to determine the aquatic macrophyte status of Chakuli beel and Bhereki beel of Majuli district. In the present study, 58 aquatic macrophytic species from 27 families were recorded. But the beel has begun to gradually deteriorate as a result of both natural and man-made activities, poor maintenance and the carelessness of the relevant government officials. For the sake of this significant wetland's survival and sustainable livelihood, appropriate conservation measures should be implemented.

Acknowledgement

The authors sincerely express heartfelt gratitude to the Department of Botany, Dakshin Kamrup College, Mirza, Assam, India for their utmost support and guidance.

Conflict of Interest

There is no conflict of interest.

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